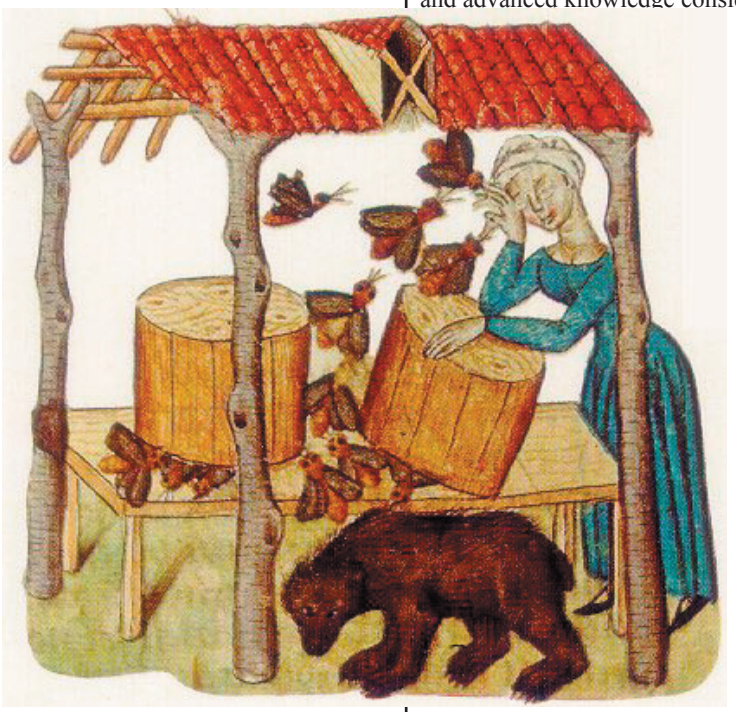
NATURE'S Grapevine

WASHINGTON CROSSING STATE PARK, NJ Autumn 2008

Of Bees, People, Honey and History

By
Ben Strauss

Honey bees (*Apis mellifica*) and humans (*Homo sapiens*) have a relationship that reaches back to prehistory and continues today and hopefully well into the future. The relationship was not always harmonious because for most of our history we robbed bees of the precious honey they need to survive and did great damage to hives in the process. And, of course, bees sometimes sting people. So much for peace, love and understanding.



The earliest documentation of our sweet tooth can be seen in a 13,000 year-old cave painting discovered in the Cuevas de La Arana in Valencia, Spain. It shows a person using what appears to be a ladder, pole or rope harvesting honeycomb from a tree or rocky crevice and placing it in a basket. This was apparently state of the art honey hunting and remained the standard operating procedure for thousands of years. But as people gradually became settled due to their growing agricultural awareness they began to relocate nests they found in logs to their settlements. Over time people learned that swarms of bees would readily accept prefabricated housing, such as baskets. Apiculture (the care and utilization of honey bees) was on its way to being.

Although agriculture was taking hold in many parts of the world it was particularly successful along the banks of the Nile River that carried huge nutrient loads during the annual flooding. Apiculture rose along side of agriculture. As early as 3,200 B.C. Egyptians were loading beehives on rafts that would float along the Nile at night and stop during the day for the bees to feed. It is not known if these ancient people were aware of the benefits of pollination but it is clear that there was a functional relationship that extended the food sources for bees and exposed more plants and crops to pollination.

There was also a spiritual relationship as evidenced by the appearance of bee figures in the tombs of pharaohs until the Roman period. Pieces of beeswax and jars of honey have been also been found in these ancient royal tombs. Honey was also used in neighboring areas in burial rituals such as the Assyrian practice of smearing the deceased with beeswax and burying the corpse encased in honey. It should be noted that the writings of all of the major religions that emerged in the Middle East contain positive references to honey.

As civilization moved westward into the Mediterranean basin the Greeks and then the Romans became involved with bees and advanced knowledge considerably. Democritus, Xenophon and Aristophanes all contributed their observations but Aristotle (384-322 B.C.) stood out in the area of empirical observation. However, the Greeks retained many unfounded beliefs, such as the mistaken Middle East notion that bee colonies came from oxen carcasses. The Romans, including Varro, Columella, Pliny and the poet Virgil whose best known work the *Aeneid* favorably mentions honeybees.

By the end of this period the applications for honey had expanded beyond it's initial use as an occasional sweet treat. Honey was now being applied topically to wounds and burns. It was only relatively recently that the antiseptic quality of honey could be scientifically established as resulting from the ripening process. Flower nectar gathered by bees typically has a moisture content of about 30 % which is reduced to about 15 % as a result of bees fanning their wings over honey cells. Hive temperature and humidity are also important in reducing water content that inhibits spoilage. Honey's low moisture content allows it to absorb moisture from other sources, such as infections.

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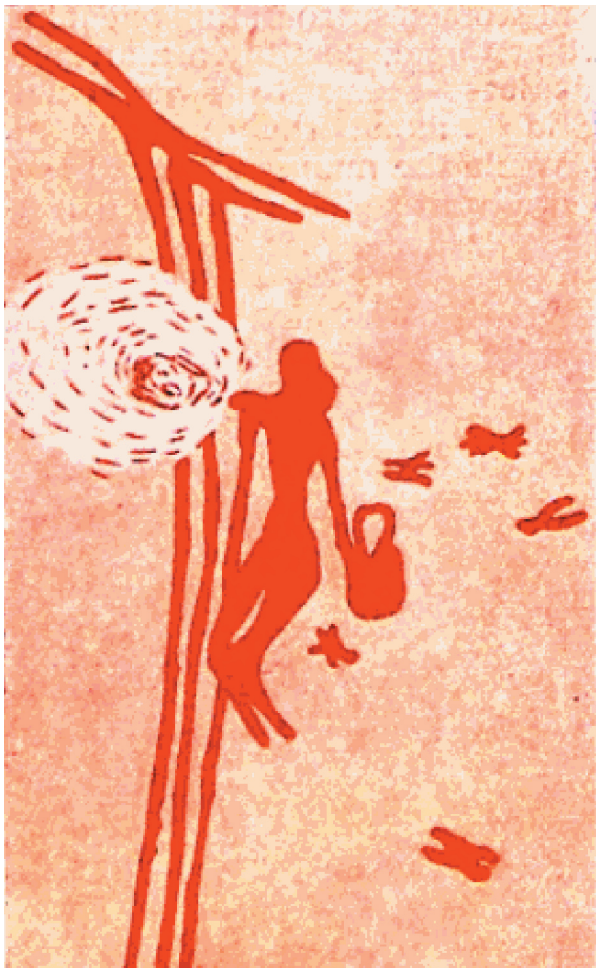


A 13,000 year old cave wall painting depicting a figure on a ladder collecting honey. Valencia, Spain.

Another new use for honey came about when water was added to honey to cause fermentation. It may have come about by accident in the course of plunging hives into hot water to kill the bees and more easily collect the honey. From there it was a short step, or perhaps stagger, to mead the legendary nectar of the gods. Mead's universal popularity faded in southern Europe as grape cultivation spread but it remained the primary drink of northern Europe where grapes were less productive due to colder weather.

Honey tastes good and is a surprisingly healthy and easily digested food. It consists of two sugars, fructose and glucose, which do not need to be broken down by the digestive system and are absorbed into the bloodstream very quickly. There are also trace amounts of vitamins, minerals and antioxidants that vary with the floral source but there is no cholesterol and only 2 per cent sodium which meets the Food and Drug Administration's standard to be classified as sodium free.

Despite all of the benefits of eating honey it should not be fed to infants less than 12 months old because their immune systems are unable ward off the *C. botulinum* spores that are sometimes present. Another danger is honey intoxication. This results as a consequence of consuming honey made from the nectar of rhododendrons mountain laurel, sheep laurel, and azaleas. This condition results in dizziness, nausea and vomiting. Less frequently, there can be a drop in blood pressure, shock, and heart beat irregularities. In rare instances, honey intoxication results in life-threatening convulsions. Honey intoxication is extremely rare in commercially prepared product chiefly because honeys from many nectar sources are blended together.

Europe slipped into the Dark Ages and apiculture most likely languished in that part of the world. However, Mexico was abuzz with bee culture. Although *Apis mellifica* was not indigenous to the New World, it is well known that the Maya people of Meso America kept *Melipona beecheii*, which is a large non-stinging honey bee. The Maya held the bee in such high esteem that they named it *Ah Mucen Cab*. That was a deity strongly associated with the Mayan creation legend. Images of *Ah Mucen Cab* as a winged descending bee deity can still be seen in the walled ruins of Tulum on the Caribbean coast that served as a major trading stop where the Mayas exchanged their honey and chocolate for other goods. The Maya also developed their own form of mead called balche that also had hallucinogenic qualities and was used in ritual ceremonies. It is believed that including the alkaloid bark of the balche tree caused this effect whose flowers were also a nectar source.

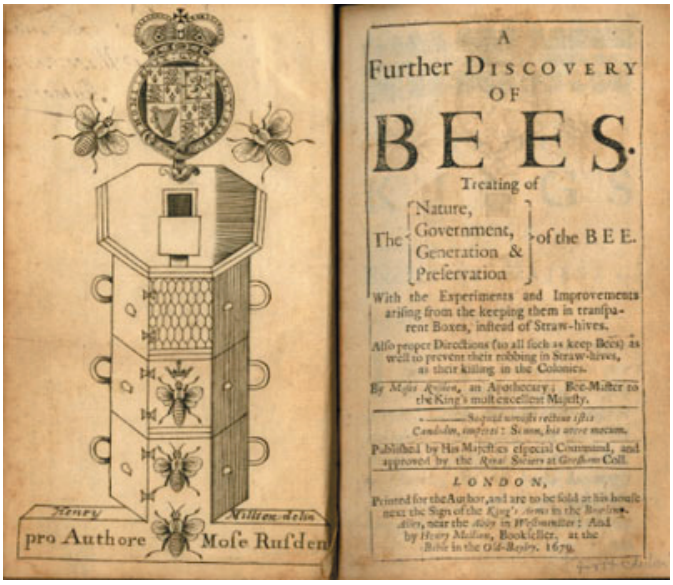
There does not seem to be a definitive explanation of the arrival of *Apis mellifica* in the Americas. There is a school of thought that Celtic and Norse voyagers brought honeybees as early as 800 A.D. However, it is generally agreed that Columbus brought them with him on his first voyage in 1492. In any event it is apparent that many European explorers and colonists brought bees with them not just to the Americas but to many other parts of the world as well.

As early as 1622 the English settlers in Virginia had beehives and the bees advanced westward on their own as a result of natural swarming. Apparently the northern Native Americans were not as bee friendly as the Maya and called the new arrivals the "white man's fly" which was probably not a term of endearment.
(Continued next page)

Honey bees are important pollinators of numerous fruit and vegetable crops.

Even as honey was being made popular around the world by Europeans, a sweet challenger was emerging. Sugar cane had been around ancient India for about 10,000 years where it was cultivated for its sweet juice. Around 350 A.D. the Indians learned how to convert the juice into granulated crystals that could be stored and transported. Soon sugar was moving around the Indian Ocean and China was actively cultivating it by 600. Sugar also spread westward but met with little long-term success because the Mediterranean countries did not have the population needed to support this labor-intensive crop. However, sugar would thrive in the New World after being first introduced by the Spanish and then the Portuguese who built mills in Brazil to process the sugar cane. By 1550 there were an estimated 3,000 mills in the New World.

In 1625 the Dutch brought sugar cane from South America to the Caribbean where it quickly spread to virtually all the islands that later became the world's center for sugar production. Although sugar was initially almost worth its weight in gold and could only be afforded by the rich, the Caribbean produced huge amounts of sugar inexpensively due to the use of slave labor. These factors made sugar more affordable to more people and honey was no longer the premier sweetener.



Vintage beekeeping literature from the apiculture collection of the library at University of Guelph in Ontario.

In 1851 technology developed by Lorenzo Lorraine Langstroth, a Philadelphia clergyman and apiculturist, transformed beekeeping like nothing previously. Beekeeping had not changed significantly since the Dark Ages. Bees were still provided houses, or skeps as they were called in Europe, but the bees did the interior design. Harvesting still pretty much consisted of manually robbing honeycomb.

Beekeeping became commercially viable when Langstroth invented the boxy looking beehive that we all recognize instantly even today as the standard. The cleverness of the hive is that it controls how the bees build their honey storing cells. Basically, the inside of the new hive is a series of frames that are flat and removable and are similar to a desk drawer of hanging files.

Beekeepers could finally harvest honey without wrecking havoc on the hive or the bees. The frames were reusable and the whole process was greatly enhanced following Langstroth's 1867 adaptation of an Italian honey extractor that used centrifugal force to push the honey out of the intact, framed comb. Due to the bees' willingness to make more honey than they needed for survival, the inclusion of extra frames resulted in surplus honey that could be harvested easily and without harming the hive.

Beekeeping became more efficient, practical and profitable because of the technological advancements from this era. Many large commercial honey companies developed and as recently as 2005 the United States, China and Turkey were the world's largest suppliers of honey. But honey would never regain its place as the world's most desired sweet. Despite losing the sweetness war, honey bees are just as important to us now as they have always been. Without honey bees as the best insect pollinators, our vegetable and fruit crops would be much reduced and some probably would disappear entirely.

Below, is a list of bee products other than honey along with description of their uses:

Pollen

Like nectar, pollen is gleaned from flowers and is a stored food source. Honey provides sugars and carbohydrates and pollen supplies trace amounts of proteins. It is unclear exactly when and where people realized that honey bees are pollinators in a class by themselves. Bees are the best pollinators for several reasons. The high degree of social organization allow the bees to over winter intact and get right to work as a group in early spring. Hives are also long-lived homes that can function for years. The bees are also physically adept due to a sticky set of rear legs that scrape up pollen as soon as the bee enters the flower for nectar. The behavioral practice of visiting only one kind of flower in a foraging flight greatly enhances the chances of successful pollination for those flowers. Some of the fruits and vegetables which are significantly dependent on the honey bee for pollination are almond, apple, asparagus, apricot, broccoli, blackberry, blueberry, brussel sprouts, cabbage, cantaloupe, carrot, cherry, cranberry, grape, onion, peach, pear, pepper, pumpkin, strawberry, sunflower and watermelon.

Bees wax

Honey bees use wax to build the cells that comprise comb to store honey and pollen for later consumption and provide a "nest" for eggs and larvae. It is secreted in speck-like bits by worker bees between 12 and 17 days old. It is doubtful if there were any early uses for wax and it was probably just something that stuck in people's teeth as they chewed on honeycomb. At some point, people learned to make superior candles that featured a bright yellow flame with very little smoke.

Wax was also used in a technique known as the lost wax process that ancient artisans utilized to make molds for fine metal artwork and jewelry. *(Continued next page)*

Basically, a wax mold would be modeled and then coated with plaster leaving a small hole remaining to allow the heated wax to drain. Molten metal could be poured in to make the final product after hardening and removing the plaster shell. This technique was first used by the Greeks and Romans and is still in use today by jewelers, goldsmiths, as well as in dentistry.

Traditionally, bees wax has been used widely for waterproofing and more recently as a component in cosmetics and pharmaceuticals that consume 60 per cent of commercially available bees wax.

Propolis

In addition to honey, wax and pollen honey bees also produce a sticky resinous glue-like substance called propolis, which dries very hard and is used for making repairs to the hive. It is also used to "mummify" hive invaders that are killed but are too large to be removed. Thus, the bees are saved from the health risk of bacteria. Propolis is sold in some health food stores as a traditional treatment for inflammations, viral diseases, ulcers, and minor burns. Some advocates claim that small doses of locally produced propolis are helpful in reducing plant allergies.

Apitoxin

Our ancient ancestors would wonder why apitoxin, or bee venom, which had inflicted so much pain on them over the centuries, would be viewed favorably today. Apitoxin, like snake venom and nettle toxin, produces local inflammation and acts as an anticoagulant. It is estimated that up to 2 % of the general population is hypersensitive and could be at risk of anaphylactic shock if stung. But apitoxin does have its virtues, which include its use to treat rheumatism, joint diseases and to desensitize people who are allergic to insect stings. It is expected that ongoing research will discover additional uses.

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Ben Strauss is a part time seasonal employee at the WCSP Nature Center and a volunteer at the Mercer County Wildlife Center. Ben and his wife Jean reside in Titusville and are both retired from the NJ Dept of Human Services.

Volunteer Notes

Eagle Scout **Mike Strasser**, Lawrenceville, and adult and scout volunteers from Scout Troop 27 came out this summer to reclaim a badly eroded section of the Blue Dot Trail. The section of the trail of interest is a former agricultural road located in an area of the park known as Cedar Bliss, between the Theater and the Steele Run. The sloped path washed out in heavy rains last winter and spring. Mike and his group graded the trail surface in order to divert runoff away from the trail and then inserted a series of perpendicular erosion control bars along the trail's length where it descends to the streambed in order to decrease the flow of surface runoff and check future erosion. Mike's project will render the trail serviceable to park visitors for years to come.

Eagle Scout **David Leestma**, Titusville, came out to WCSP over the course of several weekends last summer with adult and scout volunteers from Troop 1776 to rebuild our wildlife blind. The wildlife blind located in the woods behind the Nature Center is thirteen years old and had become weather beaten and chewed up by squirrels. David and his helpers replaced the structure's siding and roof and rearranged the view slots to better accommodate visitor use. The wildlife blind overlooks a natural spring and a feeding area and provides visitors an opportunity to observe wildlife in the area while remaining concealed in the building and undetected. The feeders at the blind are stocked with feed during the winter months.

Nettie Rekowski, Ewing, and **Terri Miller**, West Trenton, came out during programs this past summer to staff the Nature Center.

Nature Programs in the State Park

Education programs and events are available to schools, camps, scout groups, home school organizations or any other groups that would be interested in making a trip out to WCSP. The Nature Center offers hikes and walks, pond, river and stream studies, outdoor lore and nature craft programs, survival, ecology and natural resource conservation programs, wildlife programs, scout advancement activities and many other events. All programs are offered on site and are free of charge. Donations are accepted but not required or expected. Anyone who would be interested should contact the Nature Center for a list of group programs and to check available dates. A listing of group programs is also available on our website (URL on the back page of the newsletter).

Around the Park

❁The Nature Center will be hosting **Primitive Technologies Day** on Sunday October 12. Experts in a wide variety of primitive skills will be on site throughout the afternoon discussing and demonstrating ancient technologies such as stone tool making, cordage and fiber processing, fire by friction, primitive weapons, edible plants and many other skills that were developed and utilized by prehistoric peoples. The rain or shine event is free and open to the public 12:00 - 4:30.

The atlatl is an ancient device for throwing darts and small spears. Atlatl throwing will be one of the more popular events featured at Primitive Technologies Day on October 12 at the Nature Center.

❁The Nature Center feeding station and wildflower gardens were quite active this past summer. All kinds of interesting birds and insects from rose-breasted grosbeaks to monarch butterflys, hummingbird moths and ruby-throated hummingbirds were in atendance throughout the season.

A female hummingbird visits a cardinal flower in the Nature Center garden. **Photo: Wayne Henderek**

❁WCSP had some interesting visitors last spring and summer. Pileated woodpeckers are fairly unusual large woodpeckers that show up from time to time in the park. Last spring, at least one pair nested in the vicinity of the Visitor Center and the fledged young were observed throughout the forested sections of the park over the course of the summer.

A pileated woodpecker works on its nest last spring in WCSP.
Photo: Wayne Henderek

Autumn Programs
at the Nature Center

The following is a list of activities being offered through the Nature Center at Washington Crossing State Park in Titusville, New Jersey. All programs are offered free of charge, some will require advanced registration. Attendance is limited and is available on a first-come, first-served basis. All children must be accompanied by an adult. All programs will initially meet at the Nature Center. In the event of inclement weather, some programs might be canceled. It is always advisable to call ahead before coming out. ***Phone: (609) 737-0609***

FAMILY NATURE WALK (all ages) Sunday October 5, 1:30 - 2:30 p.m. Join us for an informal naturalist-guided trail walk.

PRIMITIVE TECHNOLOGIES DAY (all ages) Sunday October 12, 12:00 p.m. – 4:30 p.m. Archaeologists and primitive technologists from throughout the region will be on hand demonstrating and discussing a variety of primitive skills that local Native Americans and indigenous people from throughout the world practiced in prehistoric times.

NATURAL DYES (all ages) Sunday October 26, 1:30 - 3:30 p.m. Many interesting colors can be derived from wild plants. Come out to learn how several of our more common plants can be coaxed to yield dyes for coloring natural fabrics and take home a few samples of your own. Advanced registration required.

NATIVE AMERICANS OF THE AREA OF THE PARK (all ages) Saturday November 1, 1:00 p.m. Jim Wade, former archivist and researcher with the N.J. State Museum will discuss primitive stone tool use by Native Americans in central New Jersey. Emphasis will be on the significance and importance of the Indian way of life during the autumn season, focusing on the activities of fall hunting, gathering and religious ceremonies. The program will include a slide presentation and Native American artifacts will be on display.

FALL FOLIAGE HIKE (9 yrs. - adult) Sunday November 2, 1:30 - 4:30 p.m. This is a naturalist-guided 3 1/2 - 5 1/2 mile hike taking in the park's natural and historic areas, and several interesting and remote sections of the park during the fall foliage season. Wear sturdy footwear. Bring drinking water, a snack and a pair of binoculars.

SHELTER BUILDING WILDERNESS SURVIVAL (6 yrs. - adult) Sunday November 9, 1:30 - 3:00 p.m. This program will deal with the fundamentals pertaining to survival when lost in the wild. Participants will construct a weatherproof shelter completely from native materials. Advanced registration required after 10/7.

FAMILY NATURE WALK (all ages) Saturday November 15, 1:30 - 2:30 p.m. Join us for an informal naturalist-guided trail walk.

SHELTER BUILDING WILDERNESS SURVIVAL (6 yrs. - adult) Sunday November 16, 1:30 - 3:00 p.m. This program will deal with the fundamentals pertaining to survival when lost in the wild. Participants will construct a weatherproof shelter completely from native materials. Advanced registration required after 10/14.

NATURE CENTER CLOSED Thurs. Nov. 27 - Sun. Nov. 30.
Have a Happy Thanksgiving

FAMILY SCAVENGER HUNT (all ages) Saturday December 6, 1:00 - 4:00 p.m. Families and individuals will attempt to locate various natural objects in the park and obtain information about the area as they compete against themselves or others in this fun traditional game. Advanced registration required after 11/4.

HOLIDAY WREATH MAKING (all ages) Saturday December 13, 1:00 - 3:30 p.m. Participants will learn how to identify several species of evergreens and use clippings from these plants to construct holiday wreaths. Advanced registration required after 11/12.

NATURE CENTER CLOSED Mon. Dec. 22, 2008 - Sat. January 3, 2009
Have a Happy Holiday Season

AUTUMN PROGRAMS
AT THE VISITOR CENTER MUSEUM
Call (609) 737-9303

The Visitor Center Museum has a new interpretive video entitled "Ten Crucial Days – The Road to Liberty." This 27-minute video produced by NJN Public Television will be shown in the Visitor Center Museum's auditorium every hour on the hour from 10:00 a.m. to 3:00 p.m.

MUSKET FIRING DEMONSTRATION. Saturday, October 11, 1:00 p.m. Join a Park Historian for an interpretive talk about some of the weapons used during the American Revolution and their use during the Battle of Trenton. Included will be a musket firing demonstration.

CANNON FIRING DEMONSTRATION. Saturday, November 8, 12:00 – 4:00 p.m. Lamb's Artillery Company will be conducting artillery demonstrations at 12:00, 1:30, 2:30 & 3:30.

MUSKET FIRING DEMONSTRATION. Saturday November 22, 1:00 p.m. Join a Park Historian for an interpretive talk about some of the weapons used during the American Revolution and their use during the Battle of Trenton. Included will be a musket firing demonstration.

LECTURE *The Christmas Night Crossing*. Saturday, December 20, 2:00 p.m. Using diaries and letters of the participants, Resource Interpretive Specialist **Clay Craighead** will give a lecture on the significance of the Christmas Night Crossing and the Battle of Trenton.

THE CHRISTMAS DAY CROSSING REENACTMENT. Thursday, December 25, 1:00 p.m. Commemorate the 232nd anniversary of George Washington's famous Christmas Night crossing of the Delaware River by viewing the annual reenactment.

AUTUMN PROGRAMS
AT THE JOHNSON FERRY HOUSE AND NELSON HOUSE
Call (609) 737-2515

1830s FOODWAYS Sunday October 12, 1:00 p.m. - 4:00 p.m. Early American hearth cooking with recipies from the Federal Era. **Mercy Ingraham** will instruct this class. Meet at the Nelson House. Free.

HARVEST FEAST Saturday November 22, 11:00 a.m. - 4:00 p.m. Hearth cooking, hot cider and other activities. Meet at the Johnson Ferry House. Free.

LANTERN WALKING TOUR Friday December 19, Walking tout of historic buildings in the park commensing at the Nelson House and ending at the Johnson Ferry House. Two tours available, call the Ferry House for further information. Advanced registration required.

New Jersey Department of Environmental Protection

Nature CENTER
WASHINGTON CROSSING STATE PARK
355 Washington Crossing - Pennington Road
Titusville, New Jersey 08560-1617

NATURE'S Grapevine

Nature's Grapevine is produced quarterly by the:

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This newsletter is available free of charge. Requests to be included on the mailing list may be made by contacting the Nature Center.

Phone.....(609) 737-0609
Fax.....(609) 737-0627
Email.....1washxing@superlink.net
Hours.....Wed - Sat 9:00 a.m. - 4:00 p.m.
Sun 12:00 p.m. - 4:00 p.m.
Closed Mon and Tues
Website.....www.state.nj.us/dep/parksandforests/parks/washcros.html

Park Naturalist & Newsletter Editor.....Wayne Henderek

Reprographics.....Janssen Pharmaceutica
Titusville, NJ